

DIGITAL INFORMATION INPUT APPARATUS

BACKGROUND OF THE INVENTION

Field of the Invention

5 The invention relates to a digital information input apparatus.

Related Background Art

 A system such that image data of an object photographed by an information generating apparatus
10 such as digital camera, video camera, or the like is recorded in a recording medium existing in the information generating apparatus and transferred to an information processing apparatus such as a personal computer (PC) or the like has realized as a
15 product.

 In such a system, in order to identify and operate the data recorded in the recording medium in the information generating apparatus, logical identification information of data storage (for
20 example, a file name in the case where the data has been recorded as a file) is used or unique identification information (a handle, an ID, etc.) which can specify the data is used.

 In the above technique, for example, in the
25 case of operating the data with an external information processing apparatus by using the logical identification information such as a file name or the

like, recorded in the recording medium in the
information generating apparatus, knowledge of the
logical identification information recorded in the
recording medium in the information generating
5 apparatus has to be understood in the external
information processing apparatus and a file system or
the like in the information generating apparatus has
to be directly operated. In this case, if a logical
data management system such as a file system or the
10 like in the information generating apparatus is
changed, it is also necessary to change processes in
the external information processing apparatus.

In the case of supporting a plurality of kinds
of information generating apparatuses having
15 different file systems, the external information
processing apparatus has to support logical data
management systems such as different kinds of file
systems or the like, resulting in an increase in
installation costs.

20 As mentioned above, in the case of using the
unique identification information (the handle, ID,
etc.) which is independent of the logical data
management systems such as file systems or the like
of the information generating apparatus, the
25 identification information which is independent of
the logical data management system of the recording
medium in the information generating apparatus is

used. Therefore, even in the case of supporting a plurality of information generating apparatuses having different logical data management systems, since they can be equivalently handled by the external information processing apparatus, the installation costs are reduced. However, on the contrary, in the information generating apparatus, the unique identification information which is independent of the logical data management systems such as file systems or the like in the information generating apparatuses has to be generated and an identification information correspondance table for making the identification information of the logical data management systems such as file names or the like correspond to the generated unique identification information has to be held.

Generally, the identification information management table is stored in a work area such as a RAM or the like in the information generating apparatus and held while the information generating apparatus and the external information processing apparatus are communicating with each other. However, if a large amount of data objects exist in a storage medium existing in the information generating apparatus, a capacity of the work area such as a RAM which is necessary to construct the identification information management table increases, so that the

installation costs of the information generating apparatus are increased.

SUMMARY OF THE INVENTION

5 The invention is made in consideration of the problems as mentioned above and it is an object of the invention to make an identification information management table unnecessary while using identification information which is independent of a
10 logical data management system, thereby enabling installation costs to be reduced.

 To accomplish the above object, according to a preferred embodiment of the invention, there is disclosed a digital information input system
15 including an information generating apparatus for digitizing information and an information processing apparatus for collecting information and processing, storing, or managing the information, comprising: identification information generating means for
20 generating second data identification information which is independent of a logical data management system existing in the information generating apparatus, in accordance with a predetermined rule on the basis of first data identification information
25 which depends on the logical data management system existing in the information generating apparatus; and identification information restoring means for

restoring the first data identification information in accordance with a predetermined rule on the basis of the second data identification information.

According to another preferred embodiment of the invention, there is disclosed an information generating apparatus for digitizing information and enabling the information to be transferred to an outside, comprising: identification information generating means for generating second data identification information which is independent of a logical data management system, in accordance with a predetermined rule on the basis of first data identification information which depends on the logical data management system existing in the information generating apparatus; and identification information restoring means for restoring the first data identification information in accordance with a predetermined rule on the basis of the second data identification information.

20 An information managing method and a processing program of the digital information input system arranged between the information generating apparatus and the information processing apparatus and a recording medium in which such a program has been stored are disclosed.

Other features and advantages of the present invention will be apparent from the following

description taken in conjunction with the accompanying drawings, in which like reference characters designate the same or similar parts throughout the figures thereof.

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BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram showing a digital information input system of an embodiment;

Fig. 2 is a flowchart for explaining an image
10 data obtaining method;

Fig. 3 is a diagram for explaining a concept of generation of handle information; and

Figs. 4A and 4B are diagrams for explaining specific examples of the generation of the handle
15 information.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Embodiments of a digital information input system, an information generating apparatus, an
20 information managing method, a program, and a computer-readable storage medium of the invention will be described hereinbelow with reference to the drawings.

Fig. 1 is a block diagram showing a digital
25 information input system (digital camera system) according to an embodiment of the invention. In the embodiment, the digital information input system is

mainly divided into: an information generating apparatus (hereinafter, referred to as a digital camera) 100 such as digital camera, digital video camera, or the like; and an information processing
5 apparatus (hereinafter, referred to as a PC) 101 such as a personal computer or the like.

The digital camera 100 comprises: an optical unit 105 including a lens, a CCD, a driving circuit, and the like; a signal processing circuit 104 for
10 processing image data or the like; an operation apparatus 103 such as a CPU or the like; a primary storage device 106 such as a DRAM or the like; a secondary storage device 107 such as a built-in flash ROM or the like; an operation member 108; a display
15 apparatus 109 such as an LCD or the like; a read only memory 110 such as a ROM or the like which is used to store a program or the like; a detachable recording medium 111 such as a compact flash (registered trademark) memory card or the like; and a
20 communication control apparatus 102 for managing a connection to the personal computer PC.

The digital camera can have only the detachable recording medium 111 in dependence on a kind of digital camera or only the undetachable secondary
25 storage device 107 such as a built-in flash ROM or the like.

Although a cable connection such as a USB

(Universal Serial Bus) or the like can be mentioned with respect to the communication control apparatus 102 for managing the connection to the PC 101, for example, another connection such as a wireless
5 logical connection can be made.

An image data obtaining method which is used in the embodiment will be described with reference to Fig. 2. First, if it is intended to operate and refer to image data or the like recorded in the
10 recording medium 111 in the digital camera 100, the PC 101 issues a Get Object Handle Array request to the digital camera 100 in order to request handle information for identifying the data existing in the recording medium 111 (step S201).

15 In response to such a request, the digital camera 100 collects the data existing in the recording medium 111 by accessing a file system, generates the handle information on the basis of a file path of the file system, and transmits it to the
20 PC 101 (step S202). Details of the generation of the handle information will be described hereinlater. Thus, the handle information can be generated as unique information which is independent of the file system in the digital camera 100.

25 The PC 101 holds the received handle information therein (step S203). The PC 101 uses handle information of the data which the PC 101 wants

to get, among the held handle information, as a parameter of a Get Object request to issue it to the digital camera 100 (step S204).

In response to such a request, the digital
5 camera 100 executes a file path restoring process on the obtained handle information as will be explained hereinlater, thereby restoring the file path which depends on the file system in the digital camera 100 (step S205), retrieves the requested file by using
10 the obtained file path, and transmits the data to the PC 101 (step S206).

By receiving the data, the PC 101 can get the designated data (step S207).

The generation of the handle information
15 according to the embodiment will be described hereinbelow with reference to Fig. 3. Fig. 3 is a conceptual diagram. As shown in the diagram, in the embodiment, it is assumed as a prerequisite that the file system of the digital camera 100 is an FAT file
20 system according to a DCF (Design Rule for Camera File System).

Fundamentally, the data which is handled by the digital camera 100 in the embodiment is data specified in the DCF and it is further assumed that
25 an added data file which has newly been defined is also included. In other words, the embodiment is characterized in that all arbitrary data files

existing in the recording medium 111 are not handled. It is because the more simplified handles can be realized by adding such a limitation, when the handle information is generated.

5 As shown in Fig. 3, in the embodiment, a file path name is converted into handle information of 4 bytes. Bits constructing the handle information of 4 bytes are separated as shown by a, b, c, and d in Fig. 3 and determined as follows: (a) a kind of file; (b) 10 a file number; (c) a kind of folder; and (d) a folder number, respectively. The file path in the embodiment corresponds to first identification information in the invention and the handle information corresponds to second identification 15 information in the invention.

 As kinds of files, 1. ImageFile(jpg), 2. SoundFile(wav), and 3. MovieFile(avi) have previously been defined. As kinds of folders, 1. DCF-standard folder and 2. CanonMisc folder have previously been 20 defined.

 An explanation will be specifically made on the basis of examples shown in Figs. 4A and 4B. Figs. 4A and 4B show two examples. In the example shown in Fig. 4A, image data obtained by photographing an 25 object by a general DCF-based digital camera called "DCIM¥100Canon¥IMG_0001.jpg" is handled. In this case, first, although a folder "DCIM" exists in a

root of the recording medium, since only the files existing under DCIM are handled in the present embodiment as mentioned above, such information can be omitted when the handle is generated.

5 Therefore, the kind of folder and the folder number are determined on the basis of the folder name "100Canon". The folder number is set to 100 and the kind of folder is set to 1 because it indicates the DCF folder. A portion "Canon" added to the folder
10 name is omitted when the handle is generated. It is because, since folders whose folder numbers are the same and subsequent portions of 5 characters are different are inhibited in the DCIM according to the DCF standard, even if the portion "Canon" does not
15 exist, the folder can be unconditionally specified only by the folder number.

 Such a folder number can be expressed by "00000064h" as a hexadecimal number and the kind of folder can be expressed by "00001000h" as a
20 hexadecimal number.

 Subsequently, with respect to the file, since the file number is equal to "0001" and the kind of file is equal to "ImageFile" in a manner similar to the above, the file number is expressed by bits
25 "00010000h" as a hexadecimal number and the kind of file is expressed by bits "10000000h" as a hexadecimal number.

When the OR of those bit information is calculated, the handle information which is generated is expressed by "0x10011064".

Subsequently, the example shown in Fig. 4B will
5 be described.

In this example, audio data
"DCIM¥101TestA¥Snd_0003.wav" is handled. Also in
this case, first, although the folder "DCIM" exists
in the root of the recording medium, since only the
10 files existing under DCIM are handled in the present
embodiment as mentioned above, such information can
be omitted when the handle is generated.

Therefore, the folder number can be expressed
by "00000065h" as a hexadecimal number and the kind
15 of folder can be expressed by "00001000h" as a
hexadecimal number.

Subsequently, with respect to the file, since
the file number is equal to "0003" and the kind of
file is equal to "SoundFile" in a manner similar to
20 the above, the file number is expressed by bits
"00030000h" as a hexadecimal number and the kind of
file is expressed by bits "20000000h" as a
hexadecimal number.

When the OR of those bit information is
25 calculated, "Handle" which is generated is expressed
by "0x20031065".

Subsequently, restoration of a file path which

is used in the present embodiment will be described.
When the generated handle information is received
from the PC 101, the digital camera 100 needs to
restore the file path by which its own file system
5 can be referred to.

The restoring method is executed in accordance
with a flow opposite to that of the handle
information generating method. First, the data of 4
bytes of the handle information is divided into the
10 bit groups shown in Fig. 3 and the kind of file, the
file number, the kind of folder, and the folder
number are extracted from each bit group.

First, when the kind of folder indicates a DCF
folder, the inside of the DCIM folder is retrieved by
15 using the folder number and a folder in which the
same symbols are provided in first three characters
of the folder name is retrieved.

Subsequently, a file is specified by executing
retrieval in the retrieved folder by using the file
20 number and the kind of file.

By using the above method, the digital camera
100 can dynamically retrieve a predetermined file
from its own file system by using the handle
information received from the PC 101.

25 Other embodiments

The invention also incorporates a case where in
order to make various devices operative so as to

realize the functions of the embodiments mentioned above, program codes of software to realize the functions of the embodiments are supplied to a computer in an apparatus or a system connected to the various devices and the various devices are made operative in accordance with a program stored in a computer (or a CPU or an MPU) of the system or the apparatus, thereby embodying the invention.

In this case, the program codes themselves of the above software realize the functions of the embodiments mentioned above and the program codes themselves construct the invention. As a transferring medium of the program codes, it is possible to use a communication medium (a wired line such as an optical fiber or the like, a wireless line, or the like) in a computer network (LAN, WAN such as an Internet or the like, a wireless communication network, etc.) system for supplying the program codes by transmitting program information as a carrier wave.

Further, means for supplying the program codes to the computer, for example, a recording medium in which the program codes have been stored constructs the invention. As a recording medium for storing the program codes, for example, a flexible disk, a hard disk, an optical disk, a magnetooptic disk, a CD-ROM, a magnetic tape, a non-volatile memory card, a ROM, or the like can be used.

Naturally, the invention incorporates not only a case where a computer executes the supplied program codes, so that the functions of the embodiments mentioned above are realized but also a case where
5 the program codes operate together with an OS (Operating System) which is operating in the computer or another application software or the like and the functions of the embodiments mentioned above are realized. In this case, the program codes are also
10 naturally incorporated in the embodiments of the invention.

Further, naturally, the invention incorporates a case where the supplied program codes are stored into a memory provided for a function expanding board
15 of a computer or a function expanding unit connected to a computer, thereafter, a CPU or the like provided for the function expanding board or the function expanding unit executes a part or all of actual processes on the basis of instructions of the program
20 codes, and the functions of the embodiments mentioned above are realized by those processes.

The shape and structure of each portion shown in the embodiments are merely shown as examples at the time of embodying the invention and the technical
25 purview of the invention should not be limitedly interpreted by them. That is, many modifications and variations are possible within the spirit and scope

of the appended claims of the invention.

As mentioned above, the data recorded in the recording medium in the information generating apparatus can be operated by the external information processing apparatus by using the identification information which is independent of the logical data management system existing in the information generating apparatus. Moreover, the identification information correspondance table for making the identification information of the logical data management systems such as file names or the like correspond to the generated unique identification information does not need to be held in the information generating apparatus. The unique identification information can be converted into the identification information which depends on the logical data management system. Therefore, even if a large amount of data exists in the recording medium in the information generating apparatus, the information generating apparatus can be installed without consuming a large amount of resources such as a RAM and the like.